Optical Design of Compact High-Resolution Spectrograph for Cassegrain Telescopes with Alt-Azimuth Mount

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Abstract

Spectroscopy is a widely used analytical technique in astronomy for studying the properties of stellar objects. Spectrographs play a key role in this process by separating incoming light into its constituent wavelengths or frequencies, and recording the resulting spectra. High resolution spectroscopy can accurately determine the properties of molecules and atoms in astrophysical environments. However, the standard spectrographs are unable to couple with telescopes that have Alt-Azimuth mount and Cassegrain focus. To address this issue, a new compact high resolution spectrograph has been designed to couple with such telescopes. The proposed model is designed for the 11 inch Cassegrain type Alt-Azimuth mount telescope at the Astronomy and Space Science Unit, Department of Physics, University of Colombo. The design and optimization of the optical system, coupling mechanism, and remote access facility are key phases in the development process. A unique optical design in a compact system has been proposed with a maximum resolution. Testing of the spectrograph through observation of stellar objects and obtaining spectra will also be conducted. This new compact spectrograph can be used in any telescope with Cassegrain focus and Alt-Azimuth mount.

Key Words: spectrograph, cassegrain focus, alt-azimuth mount**,** high resolution